IN THE CLAIMS

Claims 1, 23, 31, 36-37 and 42 have been amended.

1. (Currently amended) An optical signal processor for transforming a first vector into a second vector comprising:

a plurality of linear light sources each having a longitudinal surface and each emitting light along its longitudinal surface wherein said emitted light has ~~each of which provides light having~~ an intensity responsive to a different component of the first vector;

a spatial light modulator comprising a plurality of modulation zones each of which zones receives light from substantially only one of the light sources and transmits light in proportion to a transmittance that characterizes the modulation zone; and

at least one light detector for each component of the second vector that receives light transmitted from a plurality of modulation zones, each of which is illuminated by light from a different light source, and generates a signal responsive to the received light that represents a component of the second vector.

2. (Original) An optical processor according to claim 1 wherein the modulation zones are configured in an array of columns and rows of modulation zones.

3. (Original) An optical processor according to claim 2 wherein the array of modulation zones is a rectangular array.

4. (Previously presented) An optical processor according to claim 2 wherein all the modulation zones in a same column of modulation zones are illuminated by light from a same light source.

5. (Original) An optical processor according to claim 4 wherein the at least one detector for each second vector component receives light transmitted from all the modulation zones in a different one of the rows of modulation zones.

6. (Original) An optical processor according to claim 5 wherein the at least one detector for each row of modulation zones has an aperture for collecting light that has a shape and size substantially equal to the shape and size respectively of the row of modulation zones from which it receives light.

7. (Original) An optical processor according to claim 6 wherein the aperture is contiguous with the row of modulation zones.

8. (Previously presented) An optical processor according to claim 5 wherein efficiency of light transfer between a light source and a light detector for light at a wavelength that characterizes light provided by the light sources is less than a predetermined threshold efficiency ε that satisfies a relation $\varepsilon^2 \leq 4/(N^3 \text{ x SNR})$ where N is a number of the plurality of light sources and SNR is a desired signal to noise ratio resulting from crosstalk.

9. (Original) An optical processor according to claim 5 and comprising optics that receives light transmitted from all the modulation zones in the spatial light modulator and images light from all modulation zones in each row of modulations zones to the row's at least one detector.

10. (Original) An optical processor according to claim 9 wherein the optics comprises a cylindrical lens that receives light transmitted from all the modulation zones and has its focal line substantially parallel to the rows of modulation zones and wherein the at least one light detectors for the modulation zone rows are positioned in a linear array perpendicular to the focal line so that light received from the modulation zones in a same row of modulation zones is imaged on a same one of the at least one light detectors.

11. (Original) An optical processor according to claim 5 and comprising a different collecting light pipe for each row of modulation zones in the spatial light modulator that receives light transmitted from the modulation zones in the row of modulation zones and pipes the received light and/or light generated in the light pipe responsive to the received light to the at least one light detector for the row of modulation zones.

12. (Previously presented) An optical processor according to claim 11 wherein efficiency of light transfer between a light source and a light detector for light at a wavelength that characterizes light provided by the light sources is less than a predetermined threshold efficiency ε that satisfies a relation $\varepsilon^2 \leq 4/(N^3 \text{ x SNR})$ where N is a number of the plurality of light sources and SNR is a desired signal to noise ratio resulting from crosstalk.

13. (Previously presented) An optical processor according to claim 11 wherein light provided by the light sources is characterized by a first wavelength and the collecting light pipes are provided with wavelength converters that convert light received by the light pipes from the modulation zones to light characterized by a second wavelength.

14. (Original) An optical processor according to claim 13 wherein the second wavelength is longer than the first wavelength.

15. (Previously presented) An optical processor according to claim 13 wherein surface areas of the light pipe are coated with a coating that transmits light at the first wavelength and is highly reflective for light at the second wavelength.

16. (Previously presented) An optical processor according to claim 11 wherein the collecting light pipe is a linear light pipe having two end surfaces and a light collecting surface that is a longitudinal surface region of the light pipe through which surface region light transmitted from the modulation zones in the row of modulation zones enters the light pipe.

17. (Previously presented) An optical processor according to claim 16 wherein the light pipe is a rectangular solid having four rectangular side surfaces, one of which side surfaces is the light collecting surface.

18. (Original) An optical processor according to claim 17 wherein the light collecting surface has a shape and size substantially the same as the shape and size of the area of the row of modulation zones from which it collects light.

19. (Previously presented) An optical processor according to claim 17 wherein the light collecting surface is contiguous with the row of modulation zones from which the light pipe collects light.

20. (Previously presented) An optical processor according to claim 16 wherein the at least one light detector for a second vector component comprises a single light detector that is coupled to an end surface of the collecting light pipe.

21. (Previously presented) An optical processor according to claim 16 wherein the at least one light detector comprises a light detector coupled to each end surface of the collecting light pipe.

22. (Previously presented) An optical processor according to claim 1 wherein the relative amounts of light provided by any two light sources of the plurality of light sources for components of the first vector having a same value are adjusted so that a difference in an amount of light transmitted from the light sources through modulation zones having a same transmittance that reaches the at least one detector for each of the modulation zones is reduced.

23. (Currently amended) An optical processor according to claim 1 wherein desired transmittances of modulation zones illuminated by a same light source are adjusted to compensate for differences in intensity of light along the ~~length~~ longitudinal surface of the ~~of the~~ light source that illuminates the modulation zones.

24. (Previously presented) An optical processor according to claim 1 wherein a ratio of areas of any two modulation zones illuminated by a same light source is substantially inversely proportional to the relative amounts of light that the modulation zones receive from the light source.

25. (Previously presented) An optical processor according to claim 1 wherein the relative sensitivities of any two first and second at least one detectors are adjusted to reduce a difference in output signals that they provide when they receive light from modulation zones having a same transmittance that are illuminated by a same light source.

26. (Previously presented) An optical processor according to claim 1 wherein the transmittance of each modulation zone in the spatial light modulator is fixed.

27. (Previously presented) An optical processor according to claim 1 wherein the transmittance of each modulation zone in the spatial light modulator is controllable.

28. (Previously presented) An optical signal processor according to claim 1 wherein each of the at least one light sources comprises a source light pipe that provides light from a longitudinal surface thereof to illuminate modulation zones of the spatial light modulator.

29. (Original) An optical signal processor according to claim 28 and comprising a light emitter coupled to an end surface of the source light pipe that illuminates the end surface with intensity of light responsive to a component of the first vector.

30. (Original) An optical signal processor according to claim 29 wherein the source light pipe is provided with light scattering elements.

31. (Currently amended) An optical signal processor according to claim 30 wherein the density of the ~~particles~~ elements increases with distance from the end surface so as to improve uniformity of intensity of light exiting the longitudinal surface as a function of distance from the end surface.

32. (Previously presented) An optical signal processor according to claim 1 wherein the light source is formed from a material that exhibits luminescence.

33. (Original) An optical processor according to claim 32 and comprising a light emitter that illuminates the luminescent material to excite luminescence therein having intensity responsive to a component of the first vector.

34. (Original) An optical processor according to claim 32 and comprising a source of electromagnetic field that generates an electromagnetic field in the luminescent material to excite luminescence therein having intensity responsive to a component of the first vector.

35. (Previously presented) An optical signal processor according to claim 1 wherein each of the at least one light source comprises a linear fluorescent light emitter.

36. (Currently amended) A method for transforming a first vector into a second vector comprising:

representing each component of the first vector by intensity of light provided by a linear light source having a longitudinal surface and emitting light along its longitudinal surface;

transmitting light from each light source through a plurality of modulation zones each of which transmits light in proportion to a transmittance that characterizes the modulation zone; and

using light transmitted by all the modulation zones to generate a plurality of signals, each of which represents a different component of the second vector and wherein each signal is responsive to light transmitted by at least one of the modulation zones.

37. (Currently amended) A method according to claim 36 wherein ~~and~~ no two signals are responsive to light transmitted by a same modulation zone.

38. (Previously presented) A method according to claim 36 wherein no signal is responsive to light from more than one modulation zone illuminated with light from a same light source.

39. (Previously presented) A method according to claim 36 wherein each light source illuminates a same number of modulation zones.

40. (Previously presented) A method according to claim 36 wherein each signal is substantially proportional to a total amount of light transmitted by all of the at least one of the modulation zones.

41. (Previously presented) A method according to claim 36 wherein each signal is responsive to light transmitted by a plurality of the modulation zones.

42. (Currently amended) A method of propagating an optical signal in a light pipe, the method comprising:

generating an optical signal with light characterized by a first wavelength for which light is substantially not reflected at the surface of the light pipe;

transmitting at least a portion of the light in the optical signal through a surface region of the light pipe so that it ~~is~~ enters the light pipe; and

converting the first wavelength light that enters the light pipe to light characterized by a second wavelength that is highly reflected by the surface of the light pipe.

43. (Previously presented) A method of preventing cross talk between first and second light pipes optically coupled at first and second optical junctions to a same third light pipe so as to input optical signals to the third light pipe, the method comprising:

generating optical signals in the first and second light pipes that are input to the third light pipe with light characterized by a first wavelength for which light is transmitted at the first and second optical junctions;

converting the first wavelength light that enters the third light pipe to light characterized by a second wavelength that is not transmitted through the first and second optical junctions.

44. (Original) A method according to claim 43 wherein the second wavelength light is reflected at each of the first and second optical junctions.

45. (Previously presented) A method according to claim 43 wherein the second wavelength light is absorbed at or in the vicinities of the first and second optical junctions.